Engineering (ENGR)
Contact the Physics and Engineering Department for further information.
(760) 744-1150, ext. 2505
Office: NS-355B

Associate in Arts Degrees -
AA Degree requirements are listed in Section 6 (green pages).
• Engineering

PROGRAMS OF STUDY

Engineering
Provides the background to begin upper division coursework and will prepare
the student for entry level jobs that require a knowledge of engineering
and engineering related topics. The highly sequential nature of the engineering
curriculum necessitates completion of lower division requirements before being
admitted into upper division courses.

Engineering students are urged to give priority to the completion of major field
requirements over the completion of general education requirements. Engineering
lower division requirements are not the same for different universities. These
institutions recommend that their particular lower division requirements be
completed before transfer. Students should seek early assistance in planning their
specific program from the Counseling Department, the Transfer Center, or the
Physics/Engineering Department.

A.A. DEGREE MAJOR

Program Requirements  Units
(Select a minimum of 11 units)
ARCH/DT 125 or AutoCAD Introduction to Computer Aided Drafting
DT 128  SolidWorks Introduction to 3D Design and Presentation  3
ENGR126  Intro Electric/Computer Engineering  4
ENGR 210  Electrical Network Analysis  3
ENGR 210L  Electrical Network Analysis Laboratory  1
ENGR 231  Engineering Measurement Analysis  3
ENGR 235  Engineering Mechanics Statics  3
ENGR 236  Engineering Mechanics Dynamics  3
ENGR 245  Properties of Materials  4

Electives (Select a minimum of 30 units)
Note that mathematics courses are often prerequisite
to engineering and physics courses.
MATH 140*  Calculus/Analytic Geometry, First Course  5
MATH 141  Calculus/Analytic Geometry, Second Course  4
MATH 205  Calculus/Analytic Geometry, Third Course  4
MATH 206  Calculus with Differential Equations  4
PHYS 230*  Principles of Physics  5
PHYS 231  Principles of Physics  5
PHYS 232  Principles of Physics  4
CHEM 110*  General Chemistry  3
CHEM 115*  General Chemistry  3
CHEM 110L*  General Chemistry Laboratory  2
CHEM 115L*  General Chemistry Laboratory  2

MINIMUM TOTAL UNITS  41

Recommended Elective: ENGR 100
* Courses marked with an asterisk may be used to fulfill General Education
requirements.
ENG 100, ENG 202, and BIOL 100 are highly recommended as electives to fulfill
General Education requirements.

COURSE OFFERINGS

ENGR 100  Introduction to Engineering  (1)
1 hour lecture
Transfer acceptability: CSU; UC

An overview of the engineering profession including not only the different
engineering fields but also the specialized demands and rewards of each. It will
afford the opportunity for community building among the students, who usu-
ally are otherwise isolated in the community college milieu. Group projects in
the course will encourage socialization and human relations training in what is
often perceived as a dry and dull profession. Academic success strategies will be
explained and practiced; ethical concepts will be examined through case histories
and practical applications.

ENGR 126  Introduction to Electrical and
Computer Engineering  (4)
3 hours lecture - 3 hours laboratory
Prerequisite: A minimum grade of ‘C’ in MATH 140
Transfer acceptability: CSU
Introductory concepts covering a broad range of topics in Electrical and Comput-
er Engineering presented in an integrated approach at a hands-on level. Students
work in small teams to analyze, build, and test a small programmable robot for
competition at the end of the semester. Provides basic understanding and skills
for students to later build their theoretical understanding in more advanced phys-
ics and engineering courses.

ENGR 130  Fundamentals of Electric Circuits  (4)
3 hours lecture - 3 hours laboratory
Prerequisite: A minimum grade of ‘C’ in MATH 140
Transfer acceptability: CSU
Fundamentals of DC and AC: Ohm’s Law, Kirchoff’s Laws, Thevenin’s Theorem,
magnetism, transformers, capacitance, inductance, and tuned circuits. Laboratory
covers application of theory, use of test equipment, circuit design, construction
techniques, and troubleshooting carried out through traditional workstation
procedures and by computer simulation programs.

ENGR 131  Introduction to Electronics  (4)
3 hours lecture - 3 hours laboratory
Prerequisite: A minimum grade of ‘C’ in ENGR 126 and/or ENGR 130
Transfer acceptability: CSU
Prerequisite:
Fundamentals of discrete semiconductors, linear and non-linear, analog; diodes,
power supplies, transistors, and amplifiers. Fundamentals of linear and non-linear,
analog, integrated circuits: thyristors, frequency effects, operational amplifiers,
feedback, non-linear OPAMPS, oscillators, power supplies, and communication
circuits. Laboratory covers application of theory, use of test equipment, circuit
design, construction techniques, and troubleshooting.

ENGR 134  Integrated Electronic Circuits  (4.5)
3 hours lecture - 3 hours lecture/laboratory
Prerequisite: A minimum grade of ‘C’ in ENGR 130
Transfer acceptability: CSU
Fundamentals of linear and non linear, analog, integrated circuits: thyristors,
frequency effects, operational amplifiers, feedback, non-linear OPAMPS, oscilla-
tors, power supplies, and communication circuits. Laboratory covers application
of theory, use of test equipment, circuit design, construction techniques, and
troubleshooting.

ENGR 197  Engineering Topics  (5-5)
Units awarded in topics courses are dependent upon the number of hours         re-
quired of the student. Any combination of, laboratory, or lecture/laboratory may be
scheduled by the department. Refer to Class Schedule. Refer to Class Schedule.
Note: May be taken 4 times
Transfer acceptability: CSU
Topics in Engineering. See Class Schedule for specific topic offered. Course title
will designate subject covered.

ENGR 203  Digital/Computer Electronics  (4.5)
3 hours lecture - 3 hours lecture/laboratory
Recommended preparation: ENGR 130
Transfer acceptability: CSU
Fundamental logic functions of AND’ing, OR’ing, and inverting will be studied in
various combinational and sequential logic circuits such as: encoders, decoders,
multiplexers, demultiplexers, flip-flops, registers, counters, clocks, memories, and
microprocessors. The architecture and programming of the digital microproces-
sor will be emphasized. The primary components required for proper operation of a PC (personal computer) will be addressed. Designing, testing, and troubleshooting of computers and special projects.

**ENGR 210  Electrical Network Analysis** (3)
3 hours lecture
Prerequisite: A minimum grade of 'C' in ENGR 210L and PHYS 231, or concurrent enrollment in ENGR 210L and PHYS 231

Transfer acceptability: CSU; UC
Circuit analysis by reduction methods, source transformations, loop and nodal analysis, OPAMP model for networks, transient analysis, alternating current circuits, impedance, power and phasor diagrams.

**ENGR 210L  Electrical Network Analysis Laboratory** (1)
3 hours laboratory
Prerequisite: A minimum grade of 'C' in ENGR 210, or concurrent enrollment in ENGR 210

Transfer acceptability: CSU; UC
Laboratory exercises of circuit analysis by reduction methods, source transformations, loop and nodal analysis, OPAMP model for networks, transient analysis, alternating current circuits, impedance, power, and phasor diagrams.

**ENGR 231  Engineering Measurement Analysis** (3)
2 hours lecture - 3 hours laboratory
Prerequisite: A minimum grade of 'C' in MATH 140

Transfer acceptability: CSU; UC
Analysis and treatment of engineering data. Probability, statistics, error theory, correlation and regression analysis, dimensional analysis, data processing, and preparation of technical reports. Laboratory experiments in hydraulic flow, surveying, heat transfer, and static and dynamic test systems.

**ENGR 235  Engineering Mechanics – Statics** (3)
3 hours lecture
Prerequisite: A minimum grade of 'C' in PHYS 220 and MATH 140

Transfer acceptability: CSU; UC
Force systems and equilibrium conditions. Engineering problems covering structures, machines, distributed forces, and friction. Graphical and algebraic solutions, and vectorial analysis.

**ENGR 236  Engineering Mechanics – Dynamics** (3)
3 hours lecture
Prerequisite: A minimum grade of 'C' in ENGR 235

Transfer acceptability: CSU; UC
Fundamental principles of bodies in motion; kinetics and kinematics of particles; system of particles; central force; work and energy; linear and angular momentum; moments and products of inertia; vibrations and time response; engineering applications.

**ENGR 245  Properties of Materials** (4)
3 hours lecture - 3 hours laboratory
Prerequisite: A minimum grade of 'C' in CHEM 110 and 110L

Transfer acceptability: CSU; UC
Physical properties of engineering materials. Atomic, molecular, and crystal lattice characteristics. Relations between these and mechanical, thermal, electrical, corrosion, and radiation properties. Metallic, ceramic, polymer, and agglomerate materials. Selection, treatment, and use of materials.

**ENGR 295  Directed Study in Engineering** (1, 2, 3)
3, 6, or 9 hours laboratory
Prerequisite: Approval of project or research by department chairperson

Note: May be taken 4 times

Transfer acceptability: CSU
Designed for the student who has demonstrated a proficiency in engineering subjects and the initiative to work independently on a particular sustained project which does not fit into the context of regularly scheduled classes.